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OCTOBER 24, 1882.

Mr. JACOB BINDER in the chair.

Eight persons present.

*On the Habits of the Ant-Lion.*—Rev. Dr. H. C. McCOOK remarked that, through the kindness of Mr. C. H. Baker, he had had an opportunity to observe closely some of the habits of the larva of *Myrmeleon obsoletus* Say. Several of these grubs had been taken from the sandy soil of New Jersey during the month of July, and brought to the Academy at Philadelphia in a large bowl. Their pits were of the usual character—an inverted hollow cone—but were sharper at the apex than usually represented. The pit is sometimes made by a backward movement of the grub upon a spiral line which gradually closes upon the centre. The body is just under the sand during this movement; and the grains of sand which fall upon the head are continually thrown upward by a sharp jerk of the head; this motion is somewhat lateral, not unlike the " butting " of a sheep or goat.

A pit is also formed by the grub while stationary, the violent ejection of the sand by the toss of the head, causing a vortex towards which the surrounding sand runs from all sides, thus naturally forming the concavity. Within this the creature lies concealed, and at once begins to toss the sand when the surface at the margin is agitated by a crawling insect. Sometimes the head and jaws are exposed; they are laid flat (as observed in these cases at least), extending horizontally and not vertically upward as is usually shown in figures. The habit may vary in this respect.

Dr. McCook believed that the popular impression that the grub throws sand after or at an ant when it appears to be escaping from the pit, is without foundation in fact. The sand is thrown up, more or less violently; so vigorously at times that it appears to boil. This motion causes agitation of the superincumbent sand, which begins to move toward the centre, carrying the ant with it into the jaws of the grub. The sand was tossed up with force enough to throw it out of the bowl to the distance of seven inches on the table, even pellets as large as grains of rice being thus ejected; but it flew in all directions, on the side opposite the ant, or upon the ant quite indiscriminately.

The smallest ants introduced had great difficulty in moving over the wall of the pit, as the sand crumbled and rolled away from beneath even the light emmet tread. One ant which escaped had a little ball of minute pellets attached to a hind foot, as though caused to adhere by moisture or some viscid substance within the pit. Others had minute grains adhering to the delicate hairs of the body at many points. The inquiry was suggested whether there is any secretion or excretion from the grub which may produce this effect and so contribute to secure the victim.

The ants show a strange fascination for the pit, even after they have escaped. A large Carpenter ant (*Camponotus pennsylvanicus*) was seized, escaped, rushed out of the hole, then in and around it again and again, as though verily dazed. There is a vast deal of the "Paul Pry" in the emmet nature, but the ants were rarely observed to deliberately walk into the pit. They stopped upon the edge, when they reached it in course of their rambles about the bowl, threw up their antennæ and waved them restlessly, sometimes stretched a fore-foot over the brink, sometimes retreated, sometimes turned and began to circumambulate the pit. The agitation upon the sand, slight as it was, generally (not always) aroused the grub to action, and by the process already described, the sand was withdrawn from beneath the feet of the insect, who slid along with the tiny sand-avalanche into the apex. There it was seized unless, as sometimes occurred, it was fortunate enough to make its escape.

The use of the long hooked mandibles of the grub appeared in the act of seizure; the ants were held off "at arm's length," so to speak, and the grub thrashed or jerked them violently until they were exhausted. Meanwhile, the efforts at defense were made futile by the distance from any vital point at which the victim was held. *Tetramorium cœspitum*, the Pavement ant, which has a sharp sting, and tried eagerly to use it, was thus prevented from doing so and made quite defenseless. So also the formidable pincer mandibles of the Carpenter ant, by which she excavates her wooden galleries and decapitates her victims with the facility of a guillotine, are rendered entirely useless. This defenselessness is completed by the position of the grub beneath the sand. A Carpenter worker-minor seized by a hind leg bowed her body under to snap at her captor; but her jaws grasped only the gritty pellets of sand which covered the ant-lion's head and out of which the long hooks alone projected.

The point of greatest importance which Dr. McCook observed, was the confirmation of the statements of M. Bonet, concerning the behavior of the grub when its movements are obstructed by pebbles too large to be tossed out by the head. This statement having been seriously questioned,[1] the matter was tested by first dropping three pebbles, each larger and heavier than the larva within the centre of the pit. The grub having attempted to remove these in the usual manner, and failed, proceeded in this wise: It backed up to a pebble, and placed the posterior of the abdomen against, and a little beneath it, so that the sand readily dropped over the apex of the abdomen and lay between that and the stone. A little adjustment was required to balance the pebble by getting its middle part against the end of the body, and then the animal began to back out of the pit, so pushing the pebble before, or rather behind it, up the side, and to a point a short way beyond the margin, where it was abandoned. A small furrow —two to three inches long—was described in the sand by the moving stone, which furrow was curved from the point of departure. The stone was kept perfectly balanced during the entire progress, which was quite rapid. Each of the three pebbles was thus removed, the grub returning each time and backing it out of the pit. The experiment was repeated a number of times and always with the same result. Some well-rounded stones were selected in order to make the difficulty of balancing greater, but this made no difference in the action of the larva, a round pebble being balanced and removed quite as readily as a flat one. It was a curious and amusing spectacle to witness the odd little creature thus backing the accurately poised impediments out of its domicile, and then returning to put its house in order once more. The correctness of the early observations of M. Bonet is thus fully confirmed by Dr. McCook's experiments.

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[1] Rennie, Insect Architecture, p. 202. "We may be pardoned for pausing before giving full credence to these details."

### October 31.

The President, Dr. Leidy, in the chair.

Thirty-six persons present.

The resignation of Dr. Chas. Schaeffer as Curator was received and accepted.

*Actinosphærium Eichhornii.*—Prof. Leidy remarked that he had noticed in an aquarium what appeared to be eggs, adherent to the edges of the leaves of *Vallisneria*, from the Schuylkill River. On examining the egg-like bodies with a lens, they were observed to be covered with delicate rays. On transferring some of the bodies to the field of the microscope, they proved to be giant specimens of the larger sun-animalcule, *Actinosphærium Eichhornii.* They measured from three-fourths to one millimetre in diameter, independent of the rays, which extended from one-fourth to half a millimetre more. One of the smaller individuals contained four water-fleas, Daphnias, a third of a millimetre long, and one of the larger contained six of these. The *Actinosphærium* appears to be tenacious of life; several specimens having been retained alive and in good condition for three days, in a drop of water in an animalcule cage. They had discharged the Daphnias, but retained their original size. One of oval form measured 1 mm. long by 0.75 mm. broad. The smaller ones measured 0.75 mm. in diameter. After another day they appeared in good condi-